## ABSTRACT

A sensing apparatus for use in a mass flow rate sensor for measuring a fluid flow rate includes a main conduit for containing a fluid flow, and a capillary tube for tapping a portion of the fluid flow from the main conduit at a first location, and returning the portion of the fluid flow to the conduit at a second location. The capillary tube is disposed about a centerline, and includes an inner wall defined by an inside radius measured from the centerline. The inside radius varies periodically, preferably sinusoidally, along the centerline for at least a portion of the capillary tube, thereby forming a turbulated surface on the inner wall. The turbulated inner wall increases wall surface area, and fluid mixing. The resulting increased heat transfer rate decreases the error in sensor output from nonlinear behavior.